

Modular Autonomous C&DH Software with Built-In Simulation/Test, Phase I

Completed Technology Project (2008 - 2008)



Project Introduction

NASA, the Department of Defense (DoD), and Commercial spacecraft programs have the desire to minimize program costs while continuing to ensure mission robustness and flexibility. The spacecraft system that is a cost driver throughout the program life cycle is the Command and Data Handling System (C&DH), along with the associated algorithms and software. Advanced Solutions Inc (ASI) plans to develop C&DH software which can be targeted and adapted to a wide variety of C&DH hardware architectures and mission requirements. We also recognize the need to streamline the entire spacecraft development lifecycle and provide a product that not only provides highly autonomous core flight software that is adaptable to any mission, but also has the ability to replace traditional development, integration and test elements. This will be accomplished by expanding upon our revolutionary On-board Dynamic Simulation System (ODySSy) to allow the C&DH system to support all phases of the spacecraft lifecycle. Additionally, the traditional test control room is now unnecessary and is replaced by the mission control architecture to provide a true test-like-you-fly environment. The test team, mission control team, and data analyst's can be in remote locations through use of the Web-Based Data Distribution Network (WebDDN).

Anticipated Benefits

The proposed Modular Autonomous C&DH Software with Built-In Simulation/Test has significant application to the Department of Defense (DoD) spacecraft due to the Operationally Responsive Space (ORS) initiative. The ORS goals are to make space assets available to DoD users on-demand within very short time frames. The technology proposed in this SBIR supports those goals by providing a standardized approach to flight software that is also highly adaptable through modularity. In addition, the built-in simulation/test capabilities significantly reduce the Assembly, Integration and Test timeline. The commercial spacecraft market will likewise become a potential customer via the desire to reduce cost, risk and time to orbit. This is especially critical for telecommunication constellations (broadband commercial and personal communications) where savings are multiplied due to the number of satellites involved.



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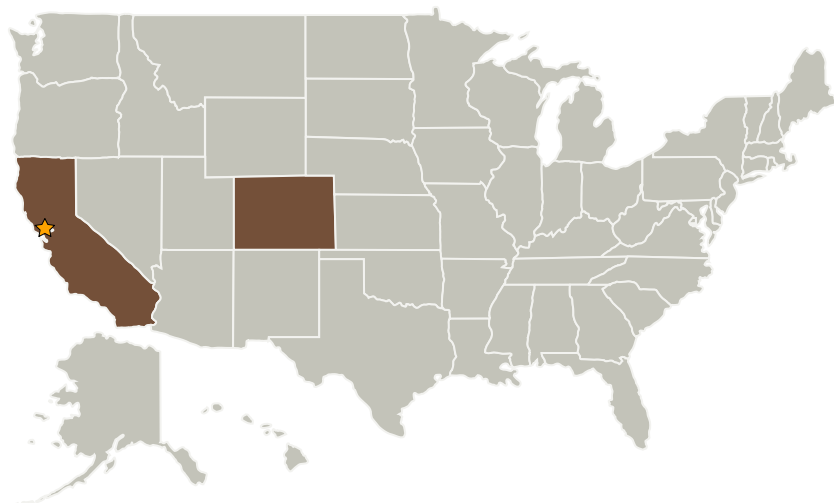
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Advanced Solutions, Inc.	Supporting Organization	Industry	Littleton, Colorado

Primary U.S. Work Locations

California	Colorado
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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Walt Truszkowski

Principal Investigator:

John Cuseo

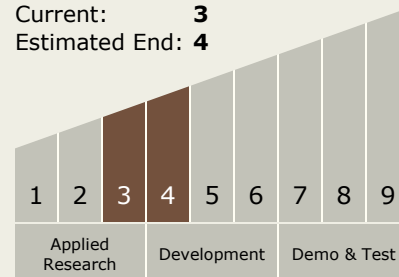
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Technology Maturity (TRL)

Start: **3**
Current: **3**
Estimated End: **4**



Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.2 Avionics Systems and Subsystems
 - └ TX02.2.1 Spacecraft Command and Data Handling Systems (C&DH)